

# MMWR

MORBIDITY AND MORTALITY WEEKLY REPORT

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## *Perspectives in Disease Prevention and Health Promotion*

### **Surgeon General's Workshop on Health Promotion and Aging: Summary Recommendations of the Alcohol Working Group**

In recent decades, the number and proportion of the U.S. population  $\geq 65$  years of age have increased remarkably. Between 1950 and 1980, this age group doubled from 12.5 million to 25.5 million (1). Persons  $\geq 65$  years of age experienced the largest increase, from 577,000 in 1950 to more than 2.2 million in 1980. The population  $\geq 65$  years old currently constitutes 12% of the total population. By the year 2030, this proportion is expected to reach 21.1% (2). As the number of older persons in the United States increases, the role of health promotion needs further exploration as a means of improving activity levels and productivity during the later years and of extending functional life spans. To meet these challenges, health professionals need to better understand the health needs of the elderly and the available preventive interventions.

The "Surgeon General's Workshop on Health Promotion and Aging" met in Washington, D.C., in March 1988 to help define unmet health promotion needs for the aging. Cosponsored by the Administration on Aging, the Public Health Service\*, the Brookdale Foundation, and the Henry J. Kaiser Family Foundation, the workshop provided the health professional community with recommendations and proposals for health promotion activities that directly address the needs of the elderly.

The workshop emphasized preventive health services, medications, dental health, injury prevention, mental health, alcohol, smoking cessation, nutrition, and physical fitness and exercise. These topics were selected because 1) scientific information is sufficient to identify actions necessary to make positive impacts, 2) constituencies are available to implement recommendations, and 3) substantial interest in the topic areas exists. Experts were commissioned to produce papers on these nine topics (3), and working groups at the workshop used these background papers in their deliberations. The resulting 365 recommendations (4) were organized by topic under the general headings of education and training, research, service, and policy.

\*Public Health Service cosponsors were the Food and Drug Administration, the National Institute on Aging, the Office of Minority Health, the Office of Disease Prevention and Health Promotion, the Centers for Disease Control, the National Institute of Mental Health, and the National Institute on Alcohol Abuse and Alcoholism.

**Aging - Continued**

One priority area for recommendations was alcohol abuse among the elderly. Although it is not possible to determine the prevalence of alcohol abuse, reported drinking appears to decline as the population ages; the estimated prevalence of alcoholism among older persons who drink approximates that of other adult populations (nearly 8%) (5).

The recommendations from the alcohol working group are summarized below. Recommendations from other selected working groups may be summarized in subsequent issues of MMWR.

**SUMMARY RECOMMENDATIONS OF THE ALCOHOL WORKING GROUP****Education and Training**

- Increased training and continuing medical education opportunities are needed that emphasize patterns of alcohol use and/or abuse among older persons, risks and potential benefits of such use, effective detection of alcohol abuse, techniques for intervention, and effective communication with patients about alcohol use.
- Social service providers, home-health aides, and other providers should be informed about the potential for alcohol abuse among older clients, about methods for identifying and referring these clients, and about how to advise family members of elderly clients with problems of alcohol abuse.
- Federal agencies, national membership and voluntary organizations, and other associations should be encouraged to develop and disseminate information about problems of alcohol abuse among older adults.

**Service**

- Treatment and reimbursement patterns for alcohol abuse among the elderly should reflect community-based versus hospital-based alternatives, as well as length of treatment.
- Development of broad-based community-level programs is needed to address alcohol problems among older persons and efforts to include an alcohol-use component (e.g., alcoholism counseling, when appropriate) in the delivery of federally sponsored preventive services.
- State and local governments and other community-based programs should strengthen relationships with alcohol-related networks (e.g., mental health centers, drug rehabilitation programs) to improve identification, referral, and treatment of older alcoholics.

**Research**

- Cross-sectional and longitudinal studies of drinking patterns among older adults, including studies using indirect measures and qualitative methods, should be expanded to determine quantity, frequency, and duration of alcohol intake.
- National data sets should be examined to characterize patterns of alcohol use among older adults.
- Analysis of drinking patterns in the elderly should focus on socioeconomic groups, minority groups, and women.
- Studies of the association between alcohol consumption and cardiovascular disease—particularly hypertension and stroke—should be expanded.
- Studies of alcohol metabolism in older persons should be extended, and animal model and human studies should be used to determine patterns of sensitivity to alcohol among older persons.
- The interplay of the aging process and alcohol abuse on cognitive functioning and the role of alcohol use in injuries common to older adults (e.g., burns and fall-related fractures) should be examined.

**Aging — Continued**

- Clinical investigators should study the alcohol withdrawal syndrome and the relationship between alcohol and nutrition in the elderly and should expand research on the role of alcohol in osteoporosis.
- The role of alcohol in family violence, in the behavior of violent older offenders, in the risk of suicide, and in victimization among older persons should be examined.
- Possible beneficial effects of small amounts of alcohol on eating behavior, mood, sleeping patterns, and social functioning among older adults should be further examined.
- Research should be conducted on the effect of alcohol on misuse of prescription and over-the-counter medications and interactions between medication and alcohol.

*Reported by: Office of the Surgeon General, Public Health Svc. Cardiovascular Health Br, Div of Chronic Disease Control and Community Intervention, Center for Chronic Disease Prevention and Health Promotion, CDC.*

**Editorial Note:** The 1990 health objectives for the nation included only two objectives specifically concerned with alcohol use among the elderly (6). In contrast, the year 2000 objectives will contain a separate set of objectives for the elderly, including several that pertain to alcohol use, which will incorporate workshop recommendations.

The varied health effects of alcohol range from the acute effects of physical and cognitive impairment to the long-term effects of certain chronic diseases and social and psychologic dysfunction. As the workshop recommendations emphasize, these negative effects coexist with the possible beneficial effects of the use of small or moderate amounts of alcohol. These dose-related, but divergent, effects of alcohol are most striking in the case of cardiovascular disease (CVD), the most common cause of death and disability among Americans  $\geq 65$  years of age (7). Coronary artery disease (CAD) exists in an estimated 3.6 million persons in this age group (7). Hypertension, a known risk factor for both CAD and stroke, affects  $>54\%$  of persons  $\geq 65$  years of age and is most prevalent among elderly persons in minority groups (8,9). Recent studies have confirmed the dose-response relationship of alcohol use and blood pressure (10,11). Other studies have demonstrated a possible beneficial link between moderate levels of alcohol intake and CAD (12,13), although this relationship is controversial. One suggested explanation for this relationship relates to the apparent effect of alcohol in raising the plasma levels of high-density lipoprotein cholesterol, the antiatherogenic fraction of plasma cholesterol (14,15). However, before a comprehensive public health policy can be established, more information is needed regarding the relationship between alcohol and CVD. The workshop recommendations emphasize the need for improved and expanded epidemiologic studies of alcohol consumption patterns and health outcomes and for specific investigations of the relationship between alcohol and CVD. These recommendations will need to be implemented in time to meet the challenge of the current demographic trends in the United States.

**References**

1. Taeuber CM. America in transition: an aging society. Washington, DC: US Department of Commerce, Bureau of the Census, 1983. (Current population reports; special studies series P-23, no. 128).
2. Spencer G. Projections of the population of the United States, by age, sex, and race: 1983 to 2080. Washington, DC: US Department of Commerce, Bureau of the Census, 1984. (Current population reports; series P-25, no. 952).

*Aging — Continued*

3. Abdellah FG, Moore SR, eds. Surgeon General's Workshop: Health Promotion and Aging—background papers. Washington, DC: Office of the Surgeon General, Public Health Service, 1988.
4. Abdellah FG, Moore SR, eds. Surgeon General's Workshop: Health Promotion and Aging—proceedings. Washington, DC: Office of the Surgeon General, Public Health Service, 1988.
5. Nace EP. Epidemiology of alcoholism and prospects for treatment. *Ann Rev Med* 1984; 35:293–309.
6. Public Health Service. Promoting health/preventing disease: objectives for the nation. Washington, DC: US Department of Health and Human Services, Public Health Service, 1980.
7. NCHS, Dawson DA, Adams PF. Current estimates from the National Health Interview Survey: United States, 1986. Hyattsville, Maryland: US Department of Health and Human Services, Public Health Service, 1987; DHHS publication no. (PHS)87-1592. (Vital and health statistics; series 10, no. 164).
8. NCHS. Blood pressure levels in persons 18–74 years of age in 1976–80, and trends in blood pressure from 1960 to 1980 in the United States: data from the National Health Survey. Hyattsville, Maryland: US Department of Health and Human Services, Public Health Service, 1986; DHHS publication no. (PHS)86-1684. (Vital and health statistics; series 11, no. 234).
9. Working Group on Risk and High Blood Pressure. An epidemiological approach to describing risk associated with blood pressure levels: final report. *Hypertension* 1985;7:641–51.
10. Friedman GD, Klatsky AL, Siegelbaum AB. Alcohol intake and hypertension. *Ann Intern Med* 1983;98(pt 2):846–9.
11. Gruchow HW, Sobocinski KA, Barboriak JJ. Alcohol, nutrient intake, and hypertension in U.S. adults. *JAMA* 1985;253:1567–70.
12. Blackwelder WC, Yano K, Rhoads GG, Kagan A, Gordon R, Palesch Y. Alcohol and mortality: the Honolulu Heart Study. *Am J Med* 1980;68:164–9.
13. Klatsky AL, Armstrong MA, Friedman GD. Relations of alcoholic beverage use to subsequent coronary artery disease hospitalization. *Am J Cardiol* 1986;58:710–4.
14. Hulley SB, Gordon S. Alcohol and high-density lipoprotein cholesterol: causal inference from diverse study designs. *Circulation* 1981;64(suppl 3 pt 2):III57–63.
15. Haskell WL, Camargo C Jr, Williams PT, et al. The effect of cessation and resumption of moderate alcohol intake on serum high-density-lipoprotein subfractions: a controlled study. *N Engl J Med* 1984;310:805–10.

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*Recommendations of the Immunization Practices Advisory Committee (ACIP)*

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**Mumps Prevention**

This revised Immunization Practices Advisory Committee (ACIP) recommendation on mumps vaccine updates the 1982 recommendation (1). Changes include: a discussion of the evolving epidemiologic characteristics of mumps, introduction of a cutoff of 1957 as the oldest birth cohort for which mumps vaccination is routinely recommended, and more aggressive outbreak-control measures. Although there are no major changes in vaccination strategy, these revised recommendations place a greater emphasis on vaccinating susceptible adolescents and young adults.

**INTRODUCTION****Mumps Disease**

Mumps disease is generally self-limited, but it may be moderately debilitating. Naturally acquired mumps infection, including the estimated 30% of infections that are subclinical, confers long-lasting immunity.

**Mumps — Continued**

Among the reported mumps-associated complications, strong epidemiologic and laboratory evidence for an association with meningoencephalitis, deafness, and orchitis has been reported (2). Meningeal signs appear in up to 15% of cases. Reported rates of mumps encephalitis range as high as five cases per 1000 reported mumps cases. Permanent sequelae are rare, but the reported encephalitis case-fatality rate has averaged 1.4%. Although overall mortality is low, death due to mumps infection is much more likely to occur in adults; about half of mumps-associated deaths have been in persons  $\geq 20$  years old (2). Sensorineural deafness is one of the most serious of the rare complications involving the central nervous system (CNS). It occurs with an estimated frequency of 0.5–5.0 per 100,000 reported mumps cases. Orchitis (usually unilateral) has been reported as a complication in 20%–30% of clinical mumps cases in postpubertal males (3). Some testicular atrophy occurs in about 35% of cases of mumps orchitis, but sterility rarely occurs. Symptomatic involvement of other organs has been observed less frequently. There are limited experimental, clinical, and epidemiologic data that suggest permanent pancreatic damage may result from injury caused by direct viral invasion. Further research is needed to determine whether mumps infection contributes to the pathogenesis of diabetes mellitus. Mumps infection during the first trimester of pregnancy may increase the rate of spontaneous abortion (reported to be as high as 27%). There is no evidence that mumps during pregnancy causes congenital malformations.

**Epidemiology**

Following the introduction of the live mumps virus vaccine in 1967 and recommendation of its routine use in 1977, the incidence rate of reported mumps cases decreased steadily in the United States. In 1985, a record low of 2982 cases was reported, representing a 98% decline from the 185,691 cases reported in 1967. However, between 1985 and 1987, a relative resurgence of mumps occurred, with 7790 cases reported in 1986 and 12,848 cases in 1987 (4). During this 3-year period, the annual reported incidence rate rose almost fivefold, from 1.1 cases per 100,000 population to 5.2 cases per 100,000 population. In 1988, a provisional total of 4730 cases was reported, representing a 62% decrease from 1987.

As in the prevaccine era, the majority of reported mumps cases still occur in school-aged children (5–14 years of age). Almost 60% of reported cases occurred in this population between 1985 and 1987, compared with an average of 75% of reported cases between 1967 and 1971, the first 5-year period postlicensure. However, for the first time since mumps became a reportable disease, the reported peak incidence rate shifted from 5–9-year-olds to older age groups for two consecutive years (1986 and 1987). Persons  $\geq 15$  years of age accounted for more than one third of the reported total between 1985 and 1987; in 1967–1971, an average of only 8% of reported cases occurred among this population. Although reported mumps incidence increased in all age groups from 1985 to 1987, the most dramatic increases were among 10–14-year-olds (almost a sevenfold increase) and 15–19-year-olds (more than an eightfold increase).

The increased occurrence of mumps in susceptible adolescents and young adults has been demonstrated in several recent outbreaks in high schools and on college campuses (5,6) and in occupational settings (7). Nonetheless, despite this age shift in reported mumps, the overall reported risk of disease in persons 10–14 and  $\geq 15$  years of age is still lower than that in the prevaccine and early postvaccine era.

**Mumps — Continued**

Consistent with previous findings (8), reported incidence rates are lower in states with comprehensive school immunization laws. The District of Columbia and 14 states that routinely reported mumps cases in 1987 had comprehensive laws that require proof of immunity against mumps for school attendance from kindergarten through grade 12 (K-12). In these 15 areas, the incidence rate in 1987 was 1.1 mumps cases per 100,000 population. In contrast, among the other states that routinely reported mumps cases in 1987, mumps incidence was highest in the 14 states without requirements for mumps vaccination (11.5 cases per 100,000 population), and intermediate (6.2 cases per 100,000 population) in the 18 states with partial vaccination requirements for school attendance (i.e., those that include some children but do not comprehensively include K-12). Furthermore, the shift in age-specific risk noted above occurred only in states without comprehensive K-12 school vaccination requirements.

Both the shift in risk to older persons and the relative resurgence of reported mumps activity noted in recent years are attributable to the relatively underimmunized cohort of children born between 1967 and 1977 (9). There is no evidence of waning immunity in vaccinated persons. During 1967-1977, the risk of exposure to mumps declined rapidly even though vaccination of children against mumps was only gradually being accepted as a routine practice. Simultaneously, mumps vaccine coverage did not reach levels >50% in any age group until 1976 (5-9-year-olds); in persons 15-19 years old, vaccine coverage did not reach these levels until 1983. This lag in coverage relative to measles and rubella vaccines reflects the lack of an ACIP recommendation for routine mumps vaccine until 1977 and the lack of emphasis in ACIP recommendations on vaccination beyond toddler age until 1980. These facts and the observed shift in risk to older persons in states without comprehensive mumps immunization school laws provide further evidence that a failure to vaccinate, rather than vaccine failure, is primarily responsible for the recently observed changes in mumps occurrence.

**MUMPS VIRUS VACCINE**

A killed mumps virus vaccine was licensed for use in the United States from 1950 through 1978. This vaccine induced antibody, but the immunity was transient. The number of doses of killed mumps vaccine administered between licensure of live attenuated mumps vaccine in 1967 until 1978 is unknown but appears to have been limited.

Mumps virus vaccine\* is prepared in chick-embryo cell culture. More than 84 million doses were distributed in the United States from its introduction in December 1967 through 1988. The vaccine produces a subclinical, noncommunicable infection with very few side effects. Mumps vaccine is available both in monovalent (mumps only) form and in combinations: mumps-rubella and measles-mumps-rubella (MMR) vaccines.

The vaccine is approximately 95% efficacious in preventing mumps disease (10,11); >97% of persons known to be susceptible to mumps develop measurable antibody following vaccination (12). Vaccine-induced antibody is protective and long-lasting (13,14), although of considerably lower titer than antibody resulting from natural infection (12). The duration of vaccine-induced immunity is unknown, but serologic and epidemiologic data collected during 20 years of live vaccine use indicate both the persistence of antibody and continuing protection against infection.

\*Official name: Mumps Virus Vaccine, Live.

**Mumps — Continued**

Estimates of clinical vaccine efficacy ranging from 75% to 95% have been calculated from data collected in outbreak settings using different epidemiologic study designs (8,15).

**Vaccine Shipment and Storage**

Administration of improperly stored vaccine may fail to protect against mumps. During storage before reconstitution, mumps vaccine must be kept at 2–8 C (35.6–46.4 F) or colder. It must also be protected from light, which may inactivate the virus. Vaccine must be shipped at 10 C (50 F) or colder and may be shipped on dry ice. After reconstitution, the vaccine should be stored in a dark place at 2–8 C (35.6–46.4 F) and discarded if not used within 8 hours.

**VACCINE USAGE**

(See also the current ACIP statement, "General Recommendations on Immunization" [16].)

**General Recommendations**

Susceptible children, adolescents, and adults should be vaccinated against mumps, unless vaccination is contraindicated. Mumps vaccine is of particular value for children approaching puberty and for adolescents and adults who have not had mumps. MMR vaccine is the vaccine of choice for routine administration and should be used in all situations where recipients are also likely to be susceptible to measles and/or rubella. The favorable benefit-cost ratio for routine mumps immunization is more marked when vaccine is administered as MMR (17). Persons should be considered susceptible to mumps unless they have documentation of 1) physician-diagnosed mumps, 2) adequate immunization with live mumps virus vaccine on or after their first birthday, or 3) laboratory evidence of immunity. Because live mumps vaccine was not used routinely before 1977 and because the peak age-specific incidence was in 5–9-year-olds before the vaccine was introduced, most persons born before 1957 are likely to have been infected naturally between 1957 and 1977. Therefore, they generally may be considered to be immune, even if they may not have had clinically recognizable mumps disease. However, this cutoff date for susceptibility is arbitrary. Although outbreak-control efforts should be focused on persons born after 1956, these recommendations do not preclude vaccination of possibly susceptible persons born before 1957 who may be exposed in outbreak settings.

Persons who are unsure of their mumps disease history and/or mumps vaccination history should be vaccinated. There is no evidence that persons who have previously either received mumps vaccine or had mumps are at any increased risk of local or systemic reactions from receiving live mumps vaccine. Testing for susceptibility before vaccination, especially among adolescents and young adults, is not necessary. In addition to the expense, some tests (e.g., mumps skin test and the complement-fixation antibody test) may be unreliable, and tests with established reliability (neutralization, enzyme immunoassay, and radial hemolysis antibody tests) are not readily available.

**Dosage.** A single dose of vaccine in the volume specified by the manufacturer should be administered subcutaneously. While not recommended routinely, intramuscular vaccination is effective and safe.

**Age.** Live mumps virus vaccine is recommended at any age on or after the first birthday for all susceptible persons, unless a contraindication exists. Under routine circumstances, mumps vaccine should be given in combination with measles and

### **Mumps – Continued**

**rubella vaccines as MMR, following the currently recommended schedule for administration of measles vaccine. It should not be administered to infants <12 months old because persisting maternal antibody might interfere with seroconversion. To insure immunity, all persons vaccinated before the first birthday should be revaccinated on or after the first birthday.**

### **Persons Exposed to Mumps**

**Use of Vaccine.** When given after exposure to mumps, live mumps virus vaccine may not provide protection. However, if the exposure did not result in infection, vaccine should induce protection against infection from subsequent exposures. There is no evidence that the risk of vaccine-associated adverse events increases if vaccine is administered to persons incubating disease.

**Use of Immune Globulin.** Immune globulin (IG) has not been demonstrated to be of established value in postexposure prophylaxis and is not recommended. Mumps immune globulin has not been shown to be effective and is no longer available or licensed for use in the United States.

*(Continued on page 397)*

**TABLE I.** Summary – cases of specified notifiable diseases, United States

Disease	22nd Week Ending			Cumulative, 22nd Week Ending		
	June 3, 1989	June 4, 1988	Median 1984-1988	June 3, 1989	June 4, 1988	Median 1984-1988
Acquired Immunodeficiency Syndrome (AIDS)	255	U*	240	14,137	13,353	5,330
Aseptic meningitis	88	91	91	1,724	1,747	1,747
Encephalitis: Primary (arthropod-borne & unspesec)	8	16	17	251	206	346
Gonorrhea: Post-infectious	1	3	3	34	45	45
Gonorrhea: Civilian	11,081	12,389	13,289	264,604	280,196	335,303
Military	144	177	258	4,489	5,146	7,122
Hepatitis: Type A	631	426	379	14,236	10,346	9,283
Type B	346	389	490	9,045	9,178	10,441
Non A, Non B	39	55	62	962	1,116	1,475
Unspecified	46	31	69	1,075	894	2,015
Legionellosis	13	14	15	332	374	268
Leprosy	5	-	5	66	74	97
Malaria	20	12	15	432	282	314
Measles: Total <sup>1</sup>	224	81	81	5,293	1,363	1,474
indigenous	211	74	74	5,014	1,214	1,327
imported	13	7	6	279	139	169
Meningococcal infections	33	46	42	1,414	1,551	1,470
Mumps	176	187	171	2,558	2,611	1,888
Pertussis	38	45	32	869	917	886
Rubella (German measles)	26	5	11	158	96	248
Syphilis (Primary & Secondary): Civilian	656	647	555	16,268	15,883	11,809
Military	1	5	3	107	83	87
Toxic Shock syndrome	5	2	5	152	134	154
Tuberculosis	249	439	376	7,979	8,214	8,477
Tularemia	1	5	5	27	53	53
Typhoid Fever	8	3	3	172	145	127
Typhus fever, tick-borne (RMSF)	10	12	27	80	82	107
Rabies, animal	93	109	109	1,912	1,693	2,167

TABLE II. Notifiable diseases of low frequency, United States

	Cum. 1989	Cum. 1988	
Anthrax	-	Leprosy	51
Botulism: Foodborne	6	Plague	-
infant	4	Poliomyelitis, Paralytic	-
Other	4	Pottacosis (Conn. 2, Wyo. 2, Calif. 1)	39
Brucellosis (S.D. 1, Calif. 5)	31	Rabies, human (Ore. 1)	1
Cholera	-	Tetanus (D.C. 1)	19
Congenital rubella syndrome	1	Trichinosis	12
Congenital syphilis, ages < 1 year	-		
Diphtheria	-		

\*Because AIDS cases are not received weekly from all reporting areas, comparison of weekly figures may be misleading.  
†Two of the 223 reported cases for this week were imported from a foreign country or can be directly traceable to a known internationally imported case within two generations.

**TABLE III. Cases of specified notifiable diseases, United States, weeks ending June 3, 1989 and June 4, 1988 (22nd Week)**

Reporting Area	AIDS	Aseptic Meningitis		Encephalitis		Gonorrhea (Civilian)		Hepatitis (Viral), by type				Legionellosis	Leprosy		
		Primary	Post-infectious	Cum. 1989	Cum. 1989	Cum. 1989	Cum. 1988	Cum. 1989	Cum. 1989	Cum. 1988	Unspecified				
UNITED STATES	14,137	1,724	251	34	264,604	280,196	14,238	9,045	962	1,075	332	66			
NEW ENGLAND	542	80	7	2	7,932	8,425	317	488	42	46	26	4			
Maine	33	3	3	-	113	187	5	19	3	1	3	-			
N.H.	16	7	-	-	69	126	30	25	7	3	-	-			
Vt.	7	1	-	-	28	65	17	37	4	-	-	-			
Mass.	282	33	2	2	2,984	3,008	102	290	19	31	17	3			
R.I.	30	23	-	-	571	777	21	40	3	3	6	-			
Conn.	194	13	2	-	4,167	4,202	142	77	6	8	-	1			
MID. ATLANTIC	4,180	218	45	4	36,265	44,549	1,832	1,357	86	143	88	9			
Upstate N.Y.	530	98	14	3	6,824	5,132	446	312	38	6	30	1			
N.Y. City	2,162	33	2	1	15,586	20,593	153	478	14	119	8	6			
N.J.	976	-	29	-	5,889	6,515	193	228	11	5	14	1			
Pa.	512	87	-	-	7,986	12,300	1,040	338	23	13	36	1			
E.N. CENTRAL	1,084	252	73	1	47,354	44,483	752	1,080	97	36	87	1			
Ohio	208	55	18	-	12,169	10,625	174	248	17	4	51	-			
Ind.	186	58	19	-	3,767	3,276	57	180	16	13	17	1			
Ill.	424	49	14	1	16,668	12,516	328	263	21	11	-	-			
Mich.	214	82	19	-	13,239	14,293	146	294	31	8	15	-			
Wis.	52	10	5	-	2,511	3,773	47	95	12	-	4	-			
W.N. CENTRAL	300	72	10	2	12,810	11,086	474	400	38	8	13	1			
Minn.	61	5	-	1	1,295	1,511	51	48	7	2	2	-			
Iowa	28	17	2	-	1,046	823	31	21	9	-	3	-			
Mo.	151	22	-	-	7,350	6,232	260	269	12	4	2	-			
N. Dak.	3	4	1	-	54	77	3	12	3	-	-	-			
S. Dak.	4	4	1	-	112	210	3	6	3	-	-	-			
Nebr.	13	5	2	-	713	661	51	14	-	-	2	1			
Kans.	42	15	4	1	2,040	1,572	75	30	4	2	4	-			
S. ATLANTIC	2,906	386	32	8	75,306	78,639	1,203	1,807	137	152	41	-			
Del.	41	10	1	-	1,199	1,141	20	66	1	2	3	-			
Md.	282	43	8	1	8,294	8,201	272	336	16	17	11	-			
D.C.	252	6	-	-	4,867	5,626	2	12	1	-	-	-			
Va.	229	63	14	-	6,303	5,434	128	117	24	93	2	-			
W. Va.	20	5	5	-	558	579	10	35	2	2	-	-			
N.C.	157	44	-	1	11,543	11,414	224	455	42	-	12	-			
S.C.	122	11	-	-	6,916	5,773	17	210	3	5	2	-			
Ga.	455	23	1	-	15,145	15,554	147	177	9	5	4	-			
Fla.	1,348	161	3	6	21,281	24,917	383	399	39	28	7	-			
E.S. CENTRAL	344	164	13	1	22,932	21,568	151	640	69	1	12	-			
Ky.	58	43	4	1	2,088	2,036	54	179	23	-	3	-			
Tenn.	113	21	-	-	7,410	7,134	44	320	17	-	6	-			
Ala.	96	76	9	-	7,484	7,123	32	93	26	1	3	-			
Miss.	77	24	-	-	5,850	5,275	21	48	3	-	-	-			
W.S. CENTRAL	1,336	144	27	2	29,254	31,648	1,649	856	70	250	18	13			
Ark.	34	5	-	-	2,943	2,869	93	28	2	1	1	-			
La.	204	14	5	-	6,194	6,632	125	152	7	1	4	-			
Okla.	75	20	7	-	2,483	2,860	161	75	15	9	10	-			
Tex.	1,023	105	15	2	17,633	19,287	1,270	601	46	239	3	13			
MOUNTAIN	451	61	8	1	5,681	6,036	2,032	572	98	82	19	2			
Mont.	4	2	-	-	92	194	17	20	1	1	2	1			
Idaho	10	-	-	-	88	174	78	41	6	2	-	-			
Wyo.	8	1	-	-	47	100	17	1	-	-	-	-			
Colo.	169	21	2	1	1,269	1,370	282	90	34	35	2	-			
N. Mex.	31	6	1	-	596	562	246	87	22	2	1	1			
Ariz.	117	24	2	-	1,995	2,155	1,088	205	19	38	8	-			
Utah	29	5	1	-	186	249	134	42	10	3	3	-			
Nebr.	83	2	2	-	1,388	1,232	169	86	6	1	3	-			
PACIFIC	2,984	367	36	13	26,770	33,762	5,628	1,845	325	357	28	36			
Wash.	270	-	-	1	2,524	2,857	1,300	358	90	24	5	2			
Oreg.	106	-	-	-	1,211	1,279	1,016	185	39	7	1	1			
Calif.	2,567	343	32	12	22,416	28,878	3,052	1,279	191	322	20	29			
Alaska	5	3	3	-	407	451	398	21	5	2	1	-			
Hawaii	46	21	1	-	212	297	61	2	-	2	1	4			
Guam	1	-	-	-	-	57	-	-	-	-	-	-			
P.R.	652	44	2	-	475	621	50	85	6	9	-	6			
V.I.	18	-	-	-	270	170	4	-	-	-	-	-			
Amer. Samoa	-	-	-	-	-	40	-	-	-	-	-	-			
C.N.M.I.	-	-	-	-	-	24	-	-	-	-	-	-			

N: Not notifiable

U: Unavailable

C.N.M.I.: Commonwealth of the Northern Mariana Islands

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending June 3, 1989 and June 4, 1988 (22nd Week)

Reporting Area	Malaria	Measles (Rubella)					Meningococcal infections	Mumps	Pertussis				Rubella			
		Indigenous		Imported*		Total			Cum. 1988	1989	Cum. 1988	1989	Cum. 1988	1989	Cum. 1988	1989
		Cum. 1988	1989	Cum. 1988	1989	Cum. 1988	1989	Cum. 1988	1989	Cum. 1988	1989	Cum. 1988	1989	Cum. 1988	1989	Cum. 1988
UNITED STATES	432	211	5,014	13	279	1,363	1,414	176	2,558	38	869	917	26	158	96	
NEW ENGLAND	27	3	129	-	16	64	104	-	24	24	207	79	-	5	1	
Maine	-	-	-	-	-	-	14	-	-	-	4	11	-	-	-	
N.H.	1	3	5	-	-	56	11	-	10	-	5	22	-	3	-	
Vt.	-	-	1	-	-	-	8	-	-	-	5	2	-	1	-	
Mass.	18	-	14	-	12	1	48	-	13	19	183	34	-	1	-	
R.I.	5	-	35	-	2	-	1	-	-	-	2	1	-	-	1	
Conn.	3	-	74	-	2	7	23	-	1	5	8	9	-	-	-	
MID. ATLANTIC	71	9	384	1	121	483	200	22	144	-	45	38	1	8	8	
Upstate N.Y.	16	6	29	1†	82	6	61	20	85	-	25	21	1	2	1	
N.Y. City	22	3	39	-	13	26	25	2	14	-	2	1	-	6	5	
N.J.	13	-	239	-	-	14	41	-	11	-	14	4	-	-	1	
Pa.	20	-	77	-	26	417	73	-	34	-	4	10	-	-	1	
E.N. CENTRAL	19	1	769	-	41	120	170	2	222	-	36	114	-	17	21	
Ohio	6	-	457	-	35	12	68	-	8	-	1	21	-	3	-	
Ind.	3	-	17	-	-	30	21	-	18	-	8	48	-	-	-	
Ill.	4	-	284	-	-	61	45	-	100	-	-	6	-	13	17	
Mich.	4	1	1	-	4	17	28	2	83	-	20	18	-	-	4	
Wis.	2	-	-	-	2	-	7	-	13	-	7	21	-	1	-	
W.N. CENTRAL	16	7	427	-	4	10	41	25	329	-	21	37	-	4	-	
Minn.	6	-	59	-	-	10	10	-	-	-	6	-	-	-	-	
Iowa	2	4	4	-	1	-	-	1	18	-	9	14	-	-	-	
Mo.	4	-	237	-	-	-	13	-	43	-	10	6	-	3	-	
N. Dak.	1	-	-	-	-	-	-	-	-	-	-	6	-	-	-	
S. Dak.	-	-	-	-	-	-	-	-	-	-	1	2	-	-	-	
Nebr.	1	-	108	-	2	-	10	1	4	-	-	-	-	-	-	
Kans.	1	3	78	-	1	-	6	23	264	-	1	3	-	-	1	
S. ATLANTIC	74	39	345	8	24	237	237	70	466	2	73	96	-	4	3	
Del.	1	-	59	-	1	-	2	1	1	-	1	3	-	-	-	
Md.	15	7	33	85	14	7	35	61	279	1	7	17	-	2	-	
D.C.	4	-	5	-	3	-	10	4	68	-	-	-	-	-	-	
Va.	11	1	6	-	3	131	28	3	60	-	4	16	-	-	-	
W. Va.	1	28	28	-	-	6	8	-	9	-	10	-	-	-	-	
N.C.	10	3	167	-	-	1	31	-	13	1	18	26	-	-	1	
S.C.	3	-	-	-	-	-	15	-	16	-	-	-	-	-	-	
Ga.	4	-	-	-	-	-	46	-	5	-	9	17	-	-	-	
Fla.	25	-	47	-	3	92	62	1	17	-	24	16	-	1	3	
E.S. CENTRAL	6	10	63	-	-	58	39	2	69	-	35	15	-	2	-	
Ky.	-	-	2	-	-	32	23	-	9	-	1	-	-	-	-	
Tenn.	-	10	32	-	-	-	2	-	26	-	8	8	-	2	-	
Ala.	2	-	29	-	-	-	11	2	8	-	25	5	-	-	-	
Miss.	2	-	-	-	-	26	3	N	N	-	1	2	-	-	-	
W.S. CENTRAL	18	69	2,387	3	30	9	99	50	994	4	27	65	-	12	6	
Ark.	-	-	-	25	2	-	5	8	101	-	10	5	-	1	2	
La.	1	-	6	-	-	-	25	23	355	-	4	9	-	5	-	
Okl.	1	10	77	-	-	8	11	10	153	4	13	24	-	1	1	
Tex.	16	59	2,304	1†	26	1	68	9	375	-	-	27	-	5	3	
MOUNTAIN	18	73	161	1	18	115	36	4	101	2	305	321	25	28	5	
Mont.	1	-	12	-	1	-	1	-	2	-	-	1	-	1	-	
Idaho	2	-	-	-	1	1	-	1	7	-	37	242	25	-	-	
Wyo.	1	-	-	-	-	-	-	-	6	-	-	1	-	-	-	
Colo.	2	25	57	-	1	114	15	2	13	1	16	11	-	-	1	
N. Mex.	1	-	15	15	15	-	-	-	N	-	4	2	-	-	-	
Ariz.	6	12	41	-	-	-	18	1	66	1	238	42	-	-	-	
Utah	-	36	36	-	-	-	2	-	3	-	6	21	-	-	3	
Nav.	3	U	-	U	-	-	-	U	4	U	1	1	U	1	1	
PACIFIC	188	-	348	-	25	277	488	1	187	8	120	155	-	78	52	
Wash.	12	-	20	-	12	2	45	1	15	1	24	39	-	-	-	
Oreg.	10	-	-	-	6	3	33	N	N	-	5	6	-	1	-	
Calif.	162	-	322	-	3	268	406	-	168	5	86	87	-	57	42	
Alaska	2	-	-	-	-	-	3	-	1	-	3	-	-	-	-	
Hawaii	2	-	7	-	4	4	1	-	9	-	2	20	-	20	10	
Guam	-	U	-	U	-	1	-	U	-	U	-	U	-	U	U	
P.R.	1	12	383	-	-	170	3	4	5	1	3	6	1	5	1	
V.I.	-	-	2	-	-	-	-	U	-	U	-	U	-	-	-	
Amur. Samos	-	U	-	U	-	-	-	U	-	U	-	U	-	-	-	
C.N.M.I.	-	U	-	U	-	-	-	U	-	U	-	U	-	-	-	

\*For measles only, imported cases includes both out-of-state and international importations.

N: Not notifiable U: Unavailable    I: International    O: Out-of-state

**TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending June 3, 1989 and June 4, 1988 (22nd Week)**

Reporting Area	Syphilis (Civilian) (Primary & Secondary)		Toxic-shock Syndrome		Tuberculosis		Tul- aremia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1989	Cum. 1988	Cum. 1989	Cum. 1988	Cum. 1989	Cum. 1988	Cum. 1989	Cum. 1989	Cum. 1988	Cum. 1989
UNITED STATES	18,268	15,883	152	7,979	8,214	27	172	80		1,912
NEW ENGLAND	701	405	5	215	159	-	13	1		2
Maine	5	5	2	3	3	-	-	-		1
N.H.	2	5	-	14	-	-	-	-		-
Vt.	-	1	-	4	1	-	-	-		-
Mass.	216	173	1	109	96	-	6	-		-
R.I.	14	13	-	29	11	-	5	-		-
Conn.	465	208	2	56	48	-	2	1		1
MID. ATLANTIC	3,029	3,303	25	1,605	1,518	1	48	5		285
Upstate N.Y.	367	219	3	115	231	-	5	3		5
N.Y. City	1,393	2,114	2	943	733	-	32	-		-
N.J.	587	367	7	243	266	-	6	-		-
Pa.	682	603	13	304	288	1	3	2		250
E.N. CENTRAL	661	483	18	912	904	2	15	11		40
Ohio	51	50	7	177	168	-	4	8		2
Ind.	27	21	4	79	91	1	1	3		2
Ill.	302	240	-	382	378	-	6	-		2
Mich.	261	156	7	228	215	-	3	-		5
Wis.	20	16	-	46	52	1	1	-		5
W.N. CENTRAL	146	93	24	232	214	7	5	8		244
Minn.	11	8	7	49	38	-	-	-		57
Iowa	17	10	4	28	16	-	2	1		63
Mo.	73	54	4	96	104	4	1	7		21
N. Dak.	1	2	-	9	4	-	-	-		14
S. Dak.	-	-	3	12	19	2	-	-		40
Nebr.	16	13	5	10	7	-	-	-		21
Kans.	28	6	1	28	26	1	1	-		28
S. ATLANTIC	6,275	5,638	15	1,742	1,775	2	12	27		603
Del.	73	57	-	19	18	-	2	-		15
Md.	323	305	-	155	184	-	2	6		167
D.C.	402	256	1	70	80	-	2	-		2
Va.	228	184	4	153	186	2	1	-		121
W. Va.	7	5	-	33	34	-	-	-		28
N.C.	388	322	4	204	140	-	2	-		14
S.C.	328	256	3	185	182	-	-	-		102
Ga.	1,314	916	2	259	280	-	-	-		104
Fla.	3,214	3,337	1	664	686	-	3	-		64
E.S. CENTRAL	1,113	862	3	708	702	3	1	10		181
Ky.	24	28	1	156	177	1	1	4		85
Tenn.	475	364	1	199	193	1	-	5		48
Ala.	373	248	1	209	204	-	-	1		48
Miss.	241	212	-	144	128	1	-	-		-
W.S. CENTRAL	2,247	1,751	13	960	1,027	7	7	11		308
Ark.	146	96	1	101	101	3	-	1		39
La.	509	340	-	128	150	-	1	-		3
Okla.	36	72	7	83	94	4	1	9		45
Tex.	1,556	1,241	5	670	682	-	5	1		221
MOUNTAIN	291	299	18	198	209	3	3	5		90
Mont.	1	2	-	8	5	-	-	3		36
Idaho	-	-	2	8	-	-	-	-		-
Wyo.	1	1	1	-	1	-	-	-		-
Colo.	51	41	4	12	31	1	1	1		25
N. Mex.	12	22	2	36	41	-	-	-		2
Ariz.	88	77	8	93	97	-	1	-		13
Utah	10	9	-	19	10	2	1	-		12
Nev.	128	147	1	22	24	-	1	-		1
PACIFIC	1,805	3,059	31	1,387	1,706	2	68	2		188
Wash.	91	98	2	83	97	-	3	-		-
Oreg.	121	119	-	56	59	-	4	1		-
Calif.	1,584	2,817	28	1,165	1,467	2	59	1		134
Alaska	3	6	-	17	16	-	-	-		55
Hawaii	6	19	1	66	67	-	2	-		-
Guam	-	3	-	-	7	-	-	-		-
P.R.	232	267	-	135	91	-	-	-		26
V.I.	1	1	-	3	3	-	-	-		-
Amer. Samoa	-	-	-	-	3	-	-	-		-
C.N.M.I.	-	1	-	-	9	-	-	-		-

U: Unavailable

TABLE IV. Deaths in 121 U.S. cities,\* week ending  
June 3, 1989 (22nd Week)

Reporting Area	All Causes, By Age (Years)						P&I** Total	Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	>65	45-64	25-44	1-24	<1			All Ages	>65	45-64	25-44	1-24	<1	
NEW ENGLAND	563	407	83	43	11	19	47	S. ATLANTIC	1,137	659	239	143	34	58	52
Boston, Mass.	148	98	23	13	8	5	17	Atlanta, Ga.	111	68	23	13	3	4	4
Bridgeport, Conn.	49	31	11	6	1	-	3	Baltimore, Md.	154	92	31	21	5	5	10
Cambridge, Mass.	16	13	2	1	-	-	1	Charlotte, N.C.	74	51	15	5	-	3	6
Fall River, Mass.	16	15	1	-	-	-	1	Jacksonville, Fla.	101	54	27	10	6	4	5
Hartford, Conn.	44	27	8	6	1	2	5	Miami, Fla.	128	61	30	29	4	4	-
Lowell, Mass.	15	15	-	-	-	-	1	Norfolk, Va.	49	32	6	4	-	7	3
Lynn, Mass.	10	8	1	1	-	-	1	Richmond, Va.	81	54	17	4	1	5	8
New Bedford, Mass.	27	23	3	1	-	-	1	Savannah, Ga.	56	32	10	9	2	3	4
New Haven, Conn.	48	35	9	1	-	-	1	St. Petersburg, Fla.	54	39	8	3	-	4	7
Providence, R.I.	34	23	6	4	-	-	1	Tampa, Fla.	85	49	18	6	2	8	1
Somerville, Mass.	7	4	3	-	-	-	1	Washington, D.C.	212	104	48	36	11	11	4
Springfield, Mass.	48	35	6	2	-	-	1	Wilmington, Del.	32	23	6	3	-	-	-
Waterbury, Conn.	35	27	3	5	-	-	1	E.S. CENTRAL	718	465	149	56	18	29	48
Worcester, Mass.	66	52	7	4	-	-	1	Birmingham, Ala.	125	77	25	10	3	10	6
MID. ATLANTIC	2,578	1,832	488	280	72	95	147	Chattanooga, Tenn.	73	47	18	4	3	1	3
Albany, N.Y.	51	33	9	3	4	2	2	Knoxville, Tenn.	77	49	15	9	3	1	10
Allentown, Pa.	14	12	2	-	-	-	1	Louisville, Ky.	71	49	16	3	2	-	2
Buffalo, N.Y.	100	65	25	8	1	1	7	Memphis, Tenn.	159	104	28	15	4	8	11
Camden, N.J.	38	22	9	4	2	1	1	Mobile, Ala.	77	45	20	7	1	4	8
Elizabeth, N.J.	27	16	7	3	1	-	2	Montgomery, Ala.	27	22	4	1	-	1	-
Erie, Pa. <sup>t</sup>	34	26	7	1	-	-	1	Nashville, Tenn.	109	72	23	7	2	5	7
Jersey City, N.J.	78	50	16	7	1	4	4	W.S. CENTRAL	1,584	958	341	190	59	46	46
N.Y. City, N.Y.	1,381	854	254	187	39	47	66	Austin, Tex.	49	31	9	6	1	2	1
Newark, N.J.	114	45	28	28	4	9	14	Baton Rouge, La.	21	13	6	2	-	-	1
Paterson, N.J.	37	18	7	5	3	4	1	Corpus Christi, Tex. <sup>s</sup>	46	36	8	2	-	-	1
Philadelphia, Pa.	306	186	68	28	12	12	12	El Paso, Tex.	39	22	8	3	2	4	2
Pittsburgh, Pa. <sup>t</sup>	40	24	10	5	-	-	1	For Worth, Tex.	73	49	11	5	4	4	2
Reading, Pa.	45	39	3	-	1	2	7	Houston, Tex. <sup>s</sup>	734	436	169	89	24	16	18
Rochester, N.Y.	105	79	18	5	-	-	3	Little Rock, Ark.	60	34	16	3	4	1	4
Schenectady, N.Y.	25	21	2	1	1	-	3	New Orleans, La.	69	28	16	19	4	2	1
Scranton, Pa. <sup>t</sup>	25	24	-	1	-	-	1	San Antonio, Tex.	166	108	22	25	6	5	4
Syracuse, N.Y.	71	49	11	2	1	8	5	Shreveport, La.	77	53	18	3	1	2	3
Trenton, N.J.	25	18	6	-	1	-	1	Tulsa, Okla.	78	55	14	7	2	-	7
Utica, N.Y.	27	24	2	-	1	-	1	MOUNTAIN	680	426	120	58	44	12	42
Yonkers, N.Y.	35	28	4	2	-	1	1	Albuquerque, N.Mex.	94	50	10	16	16	2	7
E.N. CENTRAL	2,115	1,398	428	160	53	75	101	Colorado, Colo.	41	31	4	4	1	1	4
Akron, Ohio	32	23	4	5	-	-	1	Denver, Colo.	85	55	20	3	5	2	9
Canton, Ohio	30	21	4	3	1	1	2	Las Vegas, Nev.	100	58	23	12	4	3	11
Chicago, Ill. <sup>s</sup>	564	362	125	45	10	22	16	Ogden, Utah	18	13	2	1	2	-	3
Cincinnati, Ohio	128	83	28	8	5	4	7	Phoenix, Ariz.	146	95	30	11	7	3	4
Cleveland, Ohio	151	99	25	18	4	5	6	Pueblo, Colo.	21	17	4	-	-	-	-
Columbus, Ohio	124	88	26	1	4	5	1	Salt Lake City, Utah	39	20	9	6	4	-	-
Deyton, Ohio	92	63	19	7	1	2	1	Tucson, Ariz.	116	87	18	5	5	1	4
Detroit, Mich.	218	125	50	28	8	7	12	PACIFIC	1,603	1,037	274	172	58	57	104
Evansville, Ind.	63	41	19	1	1	1	5	Berkeley, Calif.	26	21	1	1	-	-	2
Fort Wayne, Ind.	59	50	5	2	1	1	1	Fresno, Calif.	100	68	18	4	6	4	2
Gary, Ind.	11	3	4	4	-	-	1	Glendale, Calif.	12	8	2	2	-	-	2
Grand Rapids, Mich.	71	38	22	2	4	4	8	Honolulu, Hawaii	69	46	15	7	-	1	7
Indianapolis, Ind.	135	96	21	8	3	7	3	Long Beach, Calif.	67	44	16	5	-	2	12
Madison, Wis.	28	18	1	6	2	1	3	Los Angeles, Calif.	339	205	56	49	15	9	16
Milwaukee, Wis.	114	85	22	2	2	3	4	Oakland, Calif.	92	61	18	9	2	2	5
Peoria, Ill.	47	32	12	2	1	-	1	Pasadena, Calif.	31	19	5	4	2	1	1
Rockford, Ill.	48	24	12	6	1	5	3	Portland, Oreg.	105	59	22	11	6	7	7
South Bend, Ind.	50	39	4	3	1	3	2	Sacramento, Calif.	138	93	23	11	4	5	16
Toledo, Ohio	105	76	15	8	4	2	7	San Diego, Calif.	113	76	15	15	4	3	13
Youngstown, Ohio	45	32	10	1	-	-	1	San Francisco, Calif.	134	80	21	24	3	6	4
W.N. CENTRAL	589	428	87	40	17	17	28	San Jose, Calif.	161	105	27	13	7	8	5
Des Moines, Iowa	55	40	8	1	4	1	3	Seattle, Wash.	130	91	17	14	4	4	1
Duluth, Minn.	22	19	3	-	-	-	4	Spokane, Wash.	40	29	7	2	1	1	2
Kansas City, Kan.	27	18	5	2	1	1	1	Tacoma, Wash.	46	29	10	1	3	3	2
Kansas City, Mo.	101	71	16	7	6	1	1	TOTAL	11,557 <sup>††</sup>	7,411	2,209	1,152	366	408	615
Lincoln, Nebr.	26	21	4	-	-	-	1								
Minneapolis, Minn.	108	80	16	7	-	3	7								
Omaha, Nebr.	52	39	11	10	2	-	5								
St. Louis, Mo.	115	89	11	11	2	-	2								
St. Paul, Minn.	43	28	6	2	1	6	2								
Wichita, Kans.	32	23	6	-	1	2	2								

\*Mortality data in this table are voluntarily reported from 121 cities in the United States, most of which have populations of 100,000 or more. A death is reported by the place of its occurrence and by the week that the death certificate was filed. Fatal deaths are not included.

\*\*Pneumonia and influenza.

†Because of changes in reporting methods in these 3 Pennsylvania cities, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.

††Total includes unknown ages.

§Data not available. Figures are estimates based on average of past available 4 weeks.

**Mumps — Continued****Adverse Effects of Vaccine Use**

In field trials before licensure, illnesses did not occur more often in vaccinees than in unvaccinated controls (18). Reports of illnesses following mumps vaccination have mainly been episodes of parotitis and low-grade fever. Allergic reactions including rash, pruritus, and purpura have been temporally associated with mumps vaccination but are uncommon and usually mild and of brief duration. The reported occurrence of encephalitis within 30 days of receipt of a mumps-containing vaccine (0.4 per million doses) is not greater than the observed background incidence rate of CNS dysfunction in the normal population. Other manifestations of CNS involvement, such as febrile seizures and deafness, have also been infrequently reported. Complete recovery is usual. Reports of nervous system illness following mumps vaccination do not necessarily denote an etiologic relationship between the illness and the vaccine.

**Contraindications to Vaccine Use**

**Pregnancy.** Although mumps vaccine virus has been shown to infect the placenta and fetus (19), there is no evidence that it causes congenital malformations in humans. However, because of the theoretical risk of fetal damage, it is prudent to avoid giving live virus vaccine to pregnant women. Vaccinated women should avoid pregnancy for 3 months after vaccination. Routine precautions for vaccinating postpubertal women include asking if they are or may be pregnant, excluding those who say they are, and explaining the theoretical risk to those who plan to receive the vaccine. Vaccination during pregnancy should not be considered an indication for termination of pregnancy. However, the final decision about interruption of pregnancy must rest with the individual patient and her physician.

**Severe Febrile Illness.** Vaccine administration should not be postponed because of minor or intercurrent febrile illnesses, such as mild upper respiratory infections. However, vaccination of persons with severe febrile illnesses should generally be deferred until they have recovered.

**Allergies.** Because live mumps vaccine is produced in chick-embryo cell culture, persons with a history of anaphylactic reactions (hives, swelling of the mouth and throat, difficulty breathing, hypotension, or shock) after egg ingestion should be vaccinated only with caution using published protocols (20,21). Known allergic children should not leave the vaccination site for 20 minutes. Evidence indicates that persons are not at increased risk if they have egg allergies that are not anaphylactic in nature. Such persons may be vaccinated in the usual manner. There is no evidence to indicate that persons with allergies to chickens or feathers are at increased risk of reaction to the vaccine.

Since mumps vaccine contains trace amounts of neomycin (25 µg), persons who have experienced anaphylactic reactions to topically or systemically administered neomycin should not receive mumps vaccine. Most often, neomycin allergy is manifested as a contact dermatitis, which is a delayed-type (cell-mediated) immune response, rather than anaphylaxis. In such persons, the adverse reaction, if any, to 25 µg of neomycin in the vaccine would be an erythematous, pruritic nodule or papule at 48–96 hours. A history of contact dermatitis to neomycin is not a contraindication to receiving mumps vaccine. Live mumps virus vaccine does not contain penicillin.

**Recent IG Injection.** Passively acquired antibody can interfere with the response to live, attenuated-virus vaccines. Therefore, mumps vaccine should be given at least 2

*Mumps — Continued*

weeks before the administration of IG or deferred until approximately 3 months after the administration of IG.

**Altered Immunity.** In theory, replication of the mumps vaccine virus may be potentiated in patients with immune deficiency diseases and by the suppressed immune responses that occur with leukemia, lymphoma, or generalized malignancy or with therapy with corticosteroids, alkylating drugs, antimetabolites, or radiation. In general, patients with such conditions should not be given live mumps virus vaccine. Because vaccinated persons do not transmit mumps vaccine virus, the risk of mumps exposure for those patients may be reduced by vaccinating their close susceptible contacts.

An exception to these general recommendations is in children infected with human immunodeficiency virus (HIV); all asymptomatic HIV-infected children should receive MMR at 15 months of age (22). If measles vaccine is administered to symptomatic HIV-infected children, the combination MMR vaccine is generally preferred (23).

Patients with leukemia in remission whose chemotherapy has been terminated for at least 3 months may also receive live mumps virus vaccine. Short-term (<2 weeks' duration) corticosteroid therapy, topical steroid therapy (e.g., nasal, skin), and intraarticular, bursal, or tendon injection with corticosteroids do not contraindicate mumps vaccine administration. However, mumps vaccine should be avoided if systemic immunosuppressive levels are reached by prolonged, extensive, topical application.

**Other.** There is no known association between mumps vaccination and pancreatic damage or subsequent development of diabetes mellitus (24).

**MUMPS CONTROL**

The principal strategy to prevent mumps is to achieve and maintain high immunization levels, primarily in infants and young children. Universal immunization as a part of good health care should be routinely carried out in physicians' offices and public health clinics. Programs aimed at vaccinating children with MMR should be established and maintained in all communities. In addition, all other persons thought to be susceptible should be vaccinated unless otherwise contraindicated. This is especially important for adolescents and young adults in light of the recently observed increase in risk of disease in these populations.

Because access to some population subgroups is limited, the ACIP recommends taking maximal advantage of clinic visits to vaccinate susceptible persons  $\geq 15$  months of age by administering MMR, diphtheria-tetanus-pertussis (DTP), and oral polio vaccine (OPV) simultaneously if all are needed. Health agencies should take necessary steps, including the development, adoption, and enforcement of comprehensive immunization requirements, to ensure that all persons in schools at all grade levels and in day-care settings are protected against mumps. Similar requirements should be considered for colleges, as recommended by the American College Health Association (25), and selected places of employment where persons in this age cohort are likely to be concentrated or where the consequences of disease spread may be more severe (e.g., medical-care settings).

In determining means to control mumps outbreaks, exclusion of susceptible students from affected schools and schools judged by local public health authorities to be at risk for transmission should be considered. Such exclusion should be an effective means of terminating school outbreaks and quickly increasing rates of

*Mumps - Continued*

immunization. Excluded students can be readmitted immediately after vaccination. Pupils who have been exempted from mumps vaccination because of medical, religious, or other reasons should be excluded until at least 26 days after the onset of parotitis in the last person with mumps in the affected school. Experience with outbreak control for other vaccine-preventable diseases indicates that almost all students who are excluded from the outbreak area because they lack evidence of immunity quickly comply with requirements and can be readmitted to school.

**MUMPS DISEASE SURVEILLANCE AND REPORTING OF ADVERSE EVENTS**

There is a continuing need to improve the reporting of mumps cases and complications and to document the duration of vaccine effectiveness. Thus, for areas in which mumps is a reportable disease, all suspected cases of mumps should be reported to local or state health officials.

The National Childhood Vaccine Injury Compensation Program established by the National Childhood Vaccine Injury Compensation Act of 1986 requires physicians and other health-care providers who administer vaccines to maintain permanent immunization records and to report occurrences of certain adverse events to the U.S. Department of Health and Human Services. Recording and reporting requirements took effect on March 21, 1988. Reportable adverse events include those listed in the Act for mumps (26) and events specified in the manufacturer's vaccine package insert as contraindications to further doses of mumps vaccine.

Although there eventually will be one system for reporting adverse events following immunizations, two separate systems currently exist. The appropriate reporting method currently depends on the source of funding used to purchase the vaccine (26). Events that occur after receipt of a vaccine purchased with public (federal, state, and/or local government) funds must be reported by the administering health provider to the appropriate local, county, or state health department. The state health department completes and submits the correct forms to CDC. Reportable events that follow administration of vaccines purchased with private money are reported by the health-care provider directly to the Food and Drug Administration.

**RECOMMENDATIONS FOR INTERNATIONAL TRAVEL**

Mumps is still endemic throughout most of the world. While vaccination against mumps is not a requirement for entry into any country, susceptible children, adolescents, and adults would benefit by being vaccinated with a single dose of vaccine (usually as MMR), unless contraindicated, before beginning travel. Because of concern about inadequate seroconversion due to persisting maternal antibodies and because the risk of serious disease from mumps infection is relatively low, persons <12 months of age need not be given mumps vaccine before travel.

**References**

1. ACIP. Mumps vaccine. MMWR 1982;31:617-20,625.
2. CDC. Mumps surveillance, January 1977-December 1982. Atlanta: US Department of Health and Human Services, Public Health Service, 1984.
3. Philip RN, Reinhard KR, Lackman DB. Observations on a mumps epidemic in a "virgin" population. Am J Hyg 1959;69:91-111.
4. CDC. Mumps—United States, 1985-1988. MMWR 1989;38:101-5.
5. Sosin DM, Cochi SL, Gunn RA, Jennings CE, Preblud SR. The changing epidemiology of mumps and its impact on university campuses. Pediatrics 1989 (in press).
6. Wharton M, Cochi SL, Hutcheson RH, Bistowish JM, Schaffner W. A large outbreak of mumps in the postvaccine era. J Infect Dis 1988;158:1253-60.
7. Kaplan KM, Marder DC, Cochi SL, Preblud SR. Mumps in the workplace: further evidence of the changing epidemiology of a childhood vaccine-preventable disease. JAMA 1988; 260:1434-8.

*Mumps - Continued*

- B. Chaiken BP, Williams NM, Preblud SR, Parkin W, Altman R. The effect of a school entry law on mumps activity in a school district. *JAMA* 1987;257:2455-8.
- B. Cochi SL, Preblud SR, Orenstein WA. Perspectives on the relative resurgence of mumps in the United States. *Am J Dis Child* 1988;142:499-507.
10. Hilleman MR, Weibel RE, Buynak EB, Stokes J Jr, Whitman JE Jr. Live, attenuated mumps-virus vaccine: 4. Protective efficacy as measured in a field evaluation. *N Engl J Med* 1967;276:252-8.
11. Sugg WC, Finger JA, Levine RH, Pagano JS. Field evaluation of live virus mumps vaccine. *J Pediatr* 1968;72:461-6.
12. Weibel RE, Stokes J Jr, Buynak EB, Whitman JE Jr, Hilleman MR. Live, attenuated mumps-virus vaccine: 3. Clinical and serologic aspects in a field evaluation. *N Engl J Med* 1967;276:245-51.
13. Weibel RE, Buynak EB, McLean AA, Hilleman MR. Follow-up surveillance for antibody in human subjects following live attenuated measles, mumps, and rubella virus vaccines. *Proc Soc Exp Biol Med* 1979;162:328-32.
14. Weibel RE, Buynak EB, McLean AA, Roehm RR, Hilleman MR. Persistence of antibody in human subjects for 7 to 10 years following administration of combined live attenuated measles, mumps, and rubella virus vaccines. *Proc Soc Exp Biol Med* 1980;165:260-3.
15. Kim-Farley R, Bart S, Stetler H, et al. Clinical mumps vaccine efficacy. *Am J Epidemiol* 1985;121:593-7.
16. ACIP. General recommendations on immunization. *MMWR* 1989;38:205-14,219-27.
17. Koplan JP, Preblud SR. A benefit-cost analysis of mumps vaccine. *Am J Dis Child* 1982;136:362-4.
18. Hilleman MR, Buynak EB, Weibel RE, Stokes J Jr. Live, attenuated mumps-virus vaccine. *N Engl J Med* 1968;278:227-32.
19. Yamauchi T, Wilson C, St. Geme JW Jr. Transmission of live, attenuated mumps virus to the human placenta. *N Engl J Med* 1974;290:710-2.
20. Herman JJ, Radin R, Schneiderman R. Allergic reactions to measles (rubeola) vaccine in patients hypersensitive to egg protein. *J Pediatr* 1983;102:196-9.
21. Greenberg MA, Birx DL. Safe administration of mumps-measles-rubella vaccine in egg-allergic children. *J Pediatr* 1988;113:504-6.
22. ACIP. Immunization of children infected with human T-lymphotrophic virus type III/lymphadenopathy-associated virus. *MMWR* 1986;35:595-8,603-6.
23. ACIP. Immunization of children infected with human immunodeficiency virus—supplementary ACIP statement. *MMWR* 1988;37:181-3.
24. Sinaniotis CA, Daskalopoulou E, Lapatsanis P, Doxiadis S. Diabetes mellitus after mumps vaccination [Letter]. *Arch Dis Child* 1975;50:749-50.
25. American College Health Association. Position statement on immunization policy. *J Am Coll Health* 1983;32:7-8.
26. CDC. National Childhood Vaccine Injury Act: requirements for permanent vaccination records and for reporting of selected events after vaccination. *MMWR* 1988;37:197-200.

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*Current Trends***CDC Criteria for Anemia in Children and Childbearing-Aged Women**

Hemoglobin (Hb) and hematocrit (Hct) measurements are the laboratory tests used most commonly in clinical and public health settings for screening for anemia. Because most anemia in children and women of childbearing age is related to iron deficiency (1), the main purpose of anemia screening is to detect those persons at increased risk for iron deficiency. Proper anemia screening requires not only sound laboratory methods and procedures but also appropriate Hb and Hct cutoff values to define anemia. The "normal" ranges of Hb and Hct change throughout childhood and

**Anemia - Continued**

during pregnancy, and are higher for men than women (1,2). Thus, criteria for anemia should be specific for age, sex, and stage of pregnancy. Current major reference criteria for anemia, however, are not based on representative samples and fail to take into account the normal hematologic changes occurring during pregnancy. To address these limitations, CDC has formulated new reference criteria for use in clinical practice for public health and nutrition programs and the CDC Pediatric and Pregnancy Nutrition Surveillance Systems. The new criteria may also be useful for defining anemia in clinical research and nutrition surveys.

The anemia reference values for children, nonpregnant women, and men are derived from the most current nationally representative sample—the Second National Health and Nutrition Examination Survey, 1976–1980 (NHANES II). Because representative data are not yet available for pregnant women, anemia reference values are based on the most current clinical studies available. Adjustment values of Hb and Hct cutoffs are provided for persons who reside at higher altitudes and for those who smoke cigarettes.

**Anemia Cutoffs for Children, Nonpregnant Women, and Men**

Because hematologic values normally change as children grow older, it is necessary to use age-specific criteria for diagnosing anemia in children (1). The best hematologic reference data for the United States are available from the NHANES II. The Hb and Hct cutoffs recommended represent the age-specific fifth percentile values for "healthy" persons from NHANES II (Table 1) (3,4). The healthy sample was defined by excluding persons who were likely to have iron deficiency based on multiple iron biochemical measures. The anemia cutoff values based on these NHANES II studies for younger children are in close agreement with the cutoff values recommended by the American Academy of Pediatrics, which were based on a sample of healthy white middle-class children (5). Even though no data are available from NHANES II to determine anemia cutoffs for infants <1 year of age, cutoff values

**TABLE 1. Hemoglobin (Hb) and hematocrit (Hct) cutoffs for children, nonpregnant women, and men\***

Age (yrs)/Sex	Hb (g/dL)	Hct (%)
<b>Both sexes</b>		
1–1.9	11.0	33.0
2–4.9	11.2	34.0
5–7.9	11.4	34.5
8–11.9	11.6	35.0
<b>Female</b>		
12–14.9	11.8	35.5
15–17.9	12.0	36.0
≥18	12.0	36.0
<b>Male</b>		
12–14.9	12.3	37.0
15–17.9	12.6	38.0
≥18	13.6	41.0

\*Based on fifth percentile values from the Second National Health and Nutrition Examination Survey after excluding persons with a higher likelihood of iron deficiency (3,4).

**Anemia — Continued**

for children 1–2 years can be extrapolated back to 6 months of age. In general, anemia screening to detect iron deficiency is not indicated for infants <6 months of age because younger infants usually have adequate iron nutritional status (6).

**Anemia Cutoffs during Pregnancy**

During a normal pregnancy, a woman's hematologic values change substantially (2). For women with adequate iron nutrition, Hb and Hct values start to decline during the early part of first trimester, reach their nadir near the end of second trimester, then gradually rise during the third trimester (2,7–10). Because of the change of Hb and Hct during pregnancy, anemia must be characterized according to the specific stage of pregnancy. The normal range of Hb and Hct during pregnancy is based on data aggregated from four European studies of healthy iron-supplemented pregnant women (7–10). These studies provide similar findings at each specific month of pregnancy. The month-specific fifth percentile values for Hb of the pooled data have been adopted for use in the CDC Pregnancy Nutrition Surveillance System (Table 2). In addition, trimester-specific cutoffs also have been developed for use in the clinical setting (Table 2). These trimester-specific cutoffs are based on the mid-trimester values; cutoffs for the first trimester, the time at which most women are initially seen for prenatal care, are based on a late-trimester value.

**Adjustment of Hb and Hct Cutoffs for Altitude and Smoking**

Persons residing at higher altitudes (>1000 meters [3300 feet]) have higher Hb and Hct levels than those residing at sea level. This variation is due to the lower oxygen partial pressure at higher altitudes, a reduction in oxygen saturation of blood (11), and a compensatory increase in red cell production to ensure adequate oxygen supply to the tissues. Thus, higher altitude causes a generalized upward shift of the Hb and Hct distributions. This shift may be associated with the underdiagnosis of anemia for residents of higher altitudes when sea-level cutoffs are applied (CDC, unpublished data). Therefore, the proper diagnosis of anemia for those residing at higher altitudes requires an upward adjustment of Hb and Hct cutoffs. The values for altitude-specific adjustment of Hb and Hct are derived from data collected by the CDC Pediatric Nutrition Surveillance System on children residing at various altitudes in the mountain states (Table 3). Altitude affects Hb and Hct levels throughout pregnancy in a similar way (J.N. Chatfield, unpublished data).

The influence of cigarette smoking is similar to that of altitude, in that smoking increases Hb and Hct levels substantially. The higher Hb and Hct of smokers is a consequence of an increased carboxyhemoglobin from inhaling carbon monoxide

**TABLE 2. Pregnancy month-specific and trimester-specific hemoglobin (Hb) cutoffs\***

Gestation (wks)	12	16	20	24	28	32	36	40
Trimester	1 <sup>t</sup>	2	2 <sup>t</sup>	2	3	3 <sup>t</sup>	3	term
Mean Hb (g/dL)	12.2	11.8	11.6	11.6	11.8	12.1	12.5	12.9
5th percentile Hb values (g/dL)	11.0	10.6	10.5	10.5	10.7	11.0	11.4	11.9
Equivalent 5th percentile Hct <sup>s</sup> values (%)	33.0	32.0	32.0	32.0	32.0	33.0	34.0	36.0

\*Based on pooled data from four European surveys of healthy women taking iron supplements (7–10).

<sup>t</sup>Hb values adopted for the trimester-specific cutoffs.

<sup>s</sup>Hematocrit.

**Anemia — Continued**

during smoking. Because carboxyhemoglobin has no oxygen carrying capacity, its presence causes a generalized upward shift of the Hb and Hct distribution curves (CDC, unpublished data). Therefore, a smoking-specific adjustment to the anemia cutoff is necessary for the proper diagnosis of anemia in smokers. The smoking-specific Hb and Hct adjustments are derived from the NHANES II data (Table 4).

The altitude and smoking adjustments are additive. For example, a woman living at 6000 feet and smoking two or more packs of cigarettes per day would have her cutoff for anemia adjusted upward by a total of 1.4 grams of Hb or 4% Hct.

*Reported by: Div of Nutrition, Center for Chronic Disease Prevention and Health Promotion; Div of Environmental Health Laboratory Sciences, Center for Environmental Health and Injury Control; Div of Health Examination Statistics, National Center for Health Statistics; Div of Host Factors, Center for Infectious Diseases, CDC.*

**TABLE 3. Altitude adjustments for hemoglobin (Hb) and hematocrit (Hct) cutoffs**

Altitude (ft)	Hb (g/dL)	Hct (%)
<3000	0.0	0.0
3000–3999*	+0.2	+0.5
4000–4999*	+0.3	+1.0
5000–5999*	+0.5	+1.5
6000–6999*	+0.7	+2.0
7000–7999†	+1.0	+3.0
8000–8999†	+1.3	+4.0
9000–9999†	+1.6	+5.0
>10,000†	+2.0	+6.0

\*Based on data from CDC Pediatric Nutrition Surveillance System and reference 11.

†Based on reference 11 only.

**TABLE 4. Smoking adjustments for hemoglobin (Hb) and hematocrit (Hct)**

Characteristic	Hb (gm/dL)	Hct (%)
Nonsmoker	0.0	0.0
Smoker (all)	+0.3	+1.0
1/2–1 pack/day	+0.3	+1.0
1–2 packs/day	+0.5	+1.5
>2 packs/day	+0.7	+2.0

**References**

- Dallman PR, Yip R, Johnson C. Prevalence and causes of anemia in the United States, 1976 to 1980. *Am J Clin Nutr* 1984;39:437–45.
- Bothwell TH, Charlton RW. Iron deficiency in women: a report of the International Nutritional Anemia Consultative Group (INACG). New York: The Nutrition Foundation, 1981.
- Pillich SM, Senti FR, eds. Assessment of the iron nutritional status of the U.S. population based on data collected in the Second National Health and Nutrition Examination Survey, 1976–1980. Bethesda, Maryland: Federation of American Societies for Experimental Biology, Life Sciences Research Office, 1984.
- Yip R, Johnson C, Dallman PR. Age-related changes in laboratory values used in the diagnosis of anemia and iron deficiency. *Am J Clin Nutr* 1984;39:427–36.
- American Academy of Pediatrics. *Pediatric nutrition handbook*. 2nd ed. Elk Grove Village, Illinois: American Academy of Pediatrics, Committee on Nutrition, 1985.

*Anemia — Continued*

6. Smith NJ, Rosello S, Say MB, Yeya K. Iron storage in the first five years of life. *Pediatrics* 1955;16:166-71.
7. Svanberg B, Arvidsson B, Norrby A, Rybo G, Sölvell L. Absorption of supplemental iron during pregnancy: a longitudinal study with repeated bone-marrow studies and absorption measurements. *Acta Obstet Gynecol Scand Suppl* 1975;48:87-108.
8. Sjöstedt JE, Manner P, Nummi S, Ekenved G. Oral iron prophylaxis during pregnancy: a comparative study on different dosage regimens. *Acta Obstet Gynecol Scand Suppl* 1977;60:3-9.
9. Puolakka J, Järne O, Pakarinen A, Järvinen A, Viiko R. Serum ferritin as a measure of iron stores during and after normal pregnancy with and without iron supplements. *Acta Obstet Gynecol Scand Suppl* 1980;95:43-51.
10. Taylor DJ, Mallen C, McDougall N, Lind T. Effect of iron supplementation on serum ferritin levels during and after pregnancy. *Br J Obstet Gynecol* 1982;89:1011-7.
11. Hurtado A, Merino C, Delgado E. Influence of anoxemia on the hemopoietic activity. *Arch Intern Med* 1945;75:284-323.

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